

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P3041	<b>FOR FURTHER ACTION</b>		See Form PCT/IPEA/416
International application No. PCT/FI2005/000173	International filing date (day/month/year) 04.04.2005	Priority date (day/month/year) 02.04.2004	

International Patent Classification (IPC) or national classification and IPC INV. F23C10/20 B01J8/24 B01J8/18
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<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 2 sheets, as follows:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the report</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>

Date of submission of the demand 25.01.2006	Date of completion of this report 30.06.2006
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer  Coli, E Telephone No. +31 70 340-3802



# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/FI2005/000173

## Box No. I Basis of the report

1. With regard to the **language**, this report is based on

- the international application in the language in which it was filed
- a translation of the international application into , which is the language of a translation furnished for the purposes of:
  - international search (under Rules 12.3(a) and 23.1(b))
  - publication of the international application (under Rule 12.4(a))
  - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

### Description, Pages

1-10 as originally filed

### Claims, Numbers

1-12 filed with the demand

### Drawings, Sheets

1/6-6/6 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to sequence listing (*specify*):

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N) Yes: Claims 1-12

No: Claims

Inventive step (IS) Yes: Claims 1-12

No: Claims

Industrial applicability (IA) Yes: Claims 1-12

No: Claims

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1 Reference is made to the following documents:

D1: DE 30 15 798 A1 (VEB MANSFELD-KOMBINAT WILHELM PIECK; VEB MANSFELD KOMBINAT WILHELM PIE) 22 January 1981 (1981-01-22)  
D2: US-A-4 779 547 (ZUEGNER ET AL) 25 October 1988 (1988-10-25)  
D3: DE 23 35 514 A1 (CIBA-GEIGY AG) 6 February 1975 (1975-02-06)  
D4: US-A-4 748 916 (NORDH ET AL) 7 June 1988 (1988-06-07) cited in the application

2 The document D4 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

A grid nozzle of a fluidized bed gasifier or combustor, being formed of a nozzle piece attached to a nozzle tube or forming one entity with said nozzle tube, which nozzle piece comprises a nozzle chamber (7) and a horizontally extending nozzle channel (8, 9) ending to a blow opening of said nozzle, said nozzle chamber and nozzle channel being limited from above by a lid (2).

The subject-matter of claim 1 differs from this known grid nozzle in that a protecting cover (22, 32) is attached outside the lid (12) for minimizing cooling of the outer surface of the nozzle piece due to fluidizing gas blown through the nozzle into the fluidized bed gasifier or combustor.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

3 The problem linked to this kind of grid nozzles is the limited durability due to the wearing of the nozzles, which relates to the strong flow of coarse materials along the bottom grid towards a nozzle next downstream. This wearing is further accelerated by corrosion phenomena arising at specific surface temperatures of the lid.

The problem to be solved by the present invention may be therefore regarded as to reduce the wearing of a grid nozzle, by a more accurately controlling the lid temperature.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following

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(SEPARATE SHEET)**

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reasons:

Although it is well known to the skilled person that a supplementary cover, as well as any increase in the thickness of a nozzle lid, reduces the heat exchange between the fluid flowing in the nozzle and the environment around the nozzle, therefore directly influencing the surface temperature of the lid, (see D1-D3 for example) the state of the art fails to address the problem of better controlling the surface temperature of the nozzle lid to prevent an accelerated wearing.

The skilled person would not be prompt therefore to amend D1 in the direction of the solution proposed in claim 1 to solve this problem.

The subject-matter of claim 1 does involve therefore an inventive step (Article 33(3) PCT).

- 4 Claims 2 to 12 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
- 5 Claims 1 to 12 meet the requirements of the PCT with respect to industrial applicability (Article 33(4) PCT).

Claims:

1. A grid nozzle of a fluidized bed gasifier or combustor, being formed of a nozzle piece attached to a nozzle tube or forming one entity with said nozzle tube, which nozzle piece comprises a nozzle chamber (6) and a horizontally extending nozzle channel (8, 10) ending to a blow opening of said nozzle, said nozzle chamber and nozzle channel being limited from above by a lid (12), **characterized** in that a protecting cover (22, 32) is attached outside the lid (12) for minimizing cooling of the outer surface of the nozzle piece due to fluidizing gas blown through the nozzle into the fluidized bed gasifier or combustor.
2. Grid nozzle in accordance with claim 1, **characterized** in that said protecting cover (22, 32) is attached spaced apart from the lid (12).
- 15 3. Grid nozzle in accordance with one of the preceding claims, **characterized** in that said protecting cover (22, 32) comprises a cover plate (24, 34) and ribs (26, 26', 36) arranged at least to the periphery thereof.
- 20 4. Grid nozzle in accordance with one of the preceding claims, **characterized** in that said protecting cover (22, 32) is attached to the lid (12) by means of ribs (26, 26', 36) at least at the periphery of the protecting cover (22, 32).
- 25 5. Grid nozzle in accordance with one of the preceding claims, **characterized** in that heat insulation is arranged between the lid (12) and the protecting cover (22, 32).
- 30 6. Grid nozzle in accordance with one of the preceding claims, **characterized** in that the protecting cover (22, 32) is attached to the lid (12) at all sides but the one on the blow opening side of the nozzle.
7. Grid nozzle in accordance with claim 3 or 4, **characterized** in that the protecting cover (22, 32) is attached to the lid (12) by ribs (26') extending to the side surfaces of said lid.

8. Grid nozzle in accordance with one of the preceding claims, **characterized** in that means are arranged at the blow opening end of the nozzle channel (8) for forming a rising gas flow to the front of the blow opening.

5 9. Grid nozzle in accordance with one of the preceding claims, **characterized** in that a smooth bump (30) located on the upper surface of the nozzle channel (8) and extending substantially throughout the whole width thereof has been arranged at the blow opening end of the nozzle channel (8) for forming a rising gas flow in the front of the blow opening.

10 10. Grid nozzle in accordance with one of the preceding claims, **characterized** in that the protecting cover (22, 32) is of the same material with the lid (12).

15 11. Grid nozzle in accordance with one of the preceding claims, **characterized** in that the protecting cover (22, 32) is attached by welding to the lid (12) or to the sides of the lid.

12. Grid nozzle in accordance with one of the preceding claims, **characterized** in that the protecting cover (22, 32) is ceramic.